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Snowboard Binding

The invention relates to a snowboard binding according to the generic part of Claim 1.

Snowboard bindings of this kind are known (compare EP 0 624 112 B1, for example). In these the base plate can be rotated through 360° relative to the center disk. To lock the rotational movement the circumferential section of the center disk which is tapered conically or in steps, for example, towards the snowboard is provided with a toothing arrangement which mates with a corresponding toothing arrangement on the edge section of the base plate, expanding away from the snowboard, around the center opening. Screws are used as fastening elements which are screwed through the fastening openings in the center disk into inserts incorporated in the snowboard.

To prevent the base plate from rotating the toothing arrangements must be pressed together using a very high contact pressure, i.e. a torsional hold of 200 Nm is required. With the known bindings this results in the center disk being designed somewhat thinner so that its bottom side is offset with respect to the bottom side of the base plate by 2 mm, for example, in upward direction. Upon tightening of the fastening screws this causes a pulling up of the relatively flexible snowboard in this area and the running surface of the snowboard underneath the binding becomes concave. This has a distinctly negative impact on the riding performance and makes edge change and straight ahead control more difficult.

For the individual positioning of the binding on the snowboard the center disk has elongated holes which run parallel to the diameter of the center disk on both sides of the center disk. If the position of the binding is to be changed the screws have to be slackened. This can result in the stance angle, that is the angle of the base plate with respect to the axis running transverse to the snowboard, being unintentionally altered at the same time.

It is the object of the invention to provide a snowboard binding which, with a base plate reliably secured against rotational movement, does not lead to any distortion of the snowboard surface when tightening the fixing screw. At the same time, if the center disk is provided with elongated holes, there is to be no alteration to the stance angle when changing the position of the binding on the snowboard.

According to the invention this is achieved with the snowboard binding characterized in Claim 1.

Favorable embodiments of the invention are specified in the sub-claims.

The snowboard binding according to the invention is provided with at least one locking device which is arranged on the edge section of the base plate around the center opening. By means of this additional locking device the center disk is fixed on the base plate in such a way that it cannot be rotated relative to the base plate. That is, the anchoring of the center disk and with it the base plate, in vertical direction to the snowboard, takes place as before using fastening elements such as screws, for example, which are screwed into the inserts in the snowboard through the fastening openings in the middle disk, while the locking

device fixes the center disk on the base plate against rotational movement.

According to the invention there is no need for toothing arrangements to be provided on the center disk circumferential section which is tapered towards the snowboard and on the edge section of the base plate expanding away from the snowboard, around the base plate center opening, which have to be pressed together to prevent rotational movement of the base plate with respect to the center disk. That is, the circumferential section of the center disk and the edge section of the base plate can, according to the invention, be designed without toothing arrangements, thus having a smooth design.

For this reason, according to the invention, the bottom side of the center disk can be flush with the bottom side of the base plate so that the snowboard is not distorted during the tightening of the fastening screws, meaning that the running surface under the binding is not deformed. As a result of this, according to the invention, the base plate is arranged with its bottom side resting on the snowboard preferably at a maximum of 0.5 mm above the bottom side of the center disk.

The locking device is preferably designed in such a way that it presses a contact surface on the circumferential section of the center disk against a contact surface on the base plate. For pressing the two contact surfaces against each other the locking device preferably has a screw which engages in the center disk and in the base plate in the area of the contact surfaces.

In this way, the stance angle can be adjusted by actuating one single screw, whereas hitherto all fastening screws on the center disk had to be slackened.

In addition to this, the locking device or the screw ensures that the center disk is also fixed to the binding during the transport up until assembly of the binding, and is not loose in a box or similar container, as was hitherto the case.

The contact surface of the center disk is preferably formed by a radially extending projection at the center disk. The contact surface of the base plate at which the projection makes contact is preferably provided in a recess, on the bottom side of the base plate, for example. To ensure that the center disk can be fixed against rotational movement with respect to the base plate to the required 200 Nm, a frictional connection by means of a corresponding material, or a positive engagement by means of a toothing arrangement, for example, is provided at the contact surfaces that are pressed together.

In order to be able to press the contact surface on the projection against the contact surface on the base plate using the screw there is preferably a slit provided in the projection or in the base plate, which has a circular arc design with the middle of the center disk as center of the circle. The screw extends through this slit, whereby it is provided with an extension which overlaps the slit in the projection on the side of the projection facing away from the base plate, that is, on the bottom side of the projection, whereas in the case of a slit in the base plate the extension overlaps the base plate on the side facing away from the projection. The extension can be provided on a nut into which the screw is bolted or it can be a screw head.

In the angular area in which the contact surface is provided on the base plate, there is a recess in the edge section of the base plate extending away from the snowboard. As a result

of this, the surface on which the center disk rests with its circumferential section on the base plate is correspondingly reduced.

This angular area on which the base plate has this recess can, however, be kept so small that this has no noticeable impairment on the fixing of the binding vertical to the snowboard.

During the snowboarding the snowboard rider either has the left foot forward in the direction of travel, referred to as "regular" style, or the right foot forward, referred to as "Goofy" style.

When the base plate in its longitudinal direction is positioned exactly transverse to the snowboard this is referred to as 0° stance angle. The front foot in the direction of travel usually has a stance angle of between 10° and 35° in the direction of travel. The rear foot is usually positioned at a stance angle of 10° in the direction of travel up to 10° away from the direction of travel. When taking both riding styles into account an adjustment range of both bindings of 10° towards each other and 35° to the outside is then sufficient. This results in a maximum adjustment range of 45° which covers both riding styles.

Accordingly, the curved shaped slit in the projection preferably has a maximum angle of 45° and with a maximum safety margin of 60°. The angle of the recess in the expanding edge area of the base plate can be correspondingly small. I.e., the edge section of the base plate expanding away from the snowboard, around the center opening, on which the center disk rests with its circumferential section tapered towards the snowboard, can, in the binding according to the invention, be at least 240° without difficulty,

ensuring in this way a reliable fixing of the binding vertical to the snowboard.

The circumferential section of the center disk tapered towards the snowboard and the edge section of the base plate expanding away from the snowboard, around the center opening, can be of a concave design, with curved or stepped cross section. In the stepped design there is preferably only one step, i.e., the center disk has at its bottom side, and the base plate has at its upper side an outward or inward extending radial flange respectively.

There are generally three or four fastening openings provided in the center disk for the fastening screws or similar fastening means. Whereby, in the case of four fastening openings, there are respectively two provided on the one half and two on the other half of the disk and, in the case of three fastening openings, there are two on the one side and one on the other side. The two openings in the one half are arranged at the same distance from the diameter of the center disk as the two openings or the one opening in the other half of the center disk.

In order to be able to adjust the binding on the snowboard in transverse direction the fastening openings are preferably designed as elongated holes which run parallel to the diameter on both sides of the center disk.

In order to manage with a curved slit with an angle of e.g. max. 45° this diameter must intersect the curved slit asymmetrically, i.e. in such a way that the slit has a section with 10° and a section with 35°, wherein the shorter section, that is the 10° section for the left foot, when viewing the center disk from above, is on the right side and

the shorter section or the 10° section for the right foot, when viewing the center disk from above, is on the left side.

Based on the asymmetrical design of the center disk for the left or right foot it is necessary to use two injection moulds in the production of the center disk. As parts of this kind have to be manufactured with multiple tools anyway, this does not involve additional manufacturing costs worth mentioning.

The invention shall now be described in detail using the drawing. The drawing shows:

Figure 1 a perspective view of a snowboard binding;

Figure 2 a longitudinal section through part of a binding according to Figure 1;

Figure 3 a perspective view of the center disk from below; and

Figure 4 a view of the binding from below.

According to Figure 1 the Softboot snowboard binding has a base plate 1 to which a highback 2 as well as an angle strap 3 and a toe strap 4 are attached. In a circular center opening 5 in the center of the base plate 1 there is a center disk 6 which is provided with a radial flange 7 on its upper side (Figure 2 and 3) so that the center disk features a stepped circumferential section tapered towards the snowboard 8. The base plate 1 is also provided with a radial flange 9 around the center opening 5 so that the base plate 1 has an edge section which expands stepwise away from the snowboard 8. The flanges 7 and 9, which are of a smooth design, are arranged one on top of the other. For fastening the center

disk 6 and subsequently the base plate 1 on the snowboard 8 in vertical direction 10 there are four elongated holes 11 provided in the center disk 6 into which screws 12 engage which are screwed into inserts (not shown) in the snowboard 8.

A locking device B is provided to fix the base plate 1 against rotational movement, said device being designed in such a way that it presses a contact surface 13 on a radial projection 14 on the center disk 6 towards the snowboard, this being in vertical direction 10, against a contact surface 20 of the base plate 1. The locking device B is formed by a screw 15 which penetrates a slit 16 in the projection 14. The slit 16 has a circular arc design with respect to the middle M of the center disk 6. The bolt 15 which also penetrates the base plate 1, rests with its head 17 on the upper side of the base plate 1, whilst bolted into a nut 18 at the bottom end which overlaps the slit 16. The projection 14 engages in a recess 19 on the bottom side of the base plate 1, in which the contact surface 20 is arranged.

In the area of the angle α, which is taken up by the contact surface 14 or the recess 19 in the base plate, the radial flange 9 of the base plate 1 at the center opening 5 has a recess whose angle corresponds at least to the angle α. Angle α can be 120°, for example. At the contact surface 13 on the projection 14 and at the contact surface 20 on the base plate 1 there are radial toothing arrangements (not shown) for forming a positive locking.

The four elongated holes 11 are distributed in such a way that two are respectively arranged on each half of the center disk 6, wherein they are arranged at the same distance from

diameter D of the center disk 6. The elongated holes 11 run parallel to diameter D of the center disk 6.

In order to cover all riding styles the base plate must be able to rotate up to 45° with respect to the center disk 6. I.e. the front foot is usually positioned between 10° and 35° in the direction of travel, whereas the rear foot is positioned from 10° in the direction of travel to 10° away from the direction of travel.

To manage with a slit 16 with an angle of max. 45° the diameter D must intersect the curved slit 16 in the projection 14 in such a way that the slit 16 has a section A with an angle of 10° and a section C with an angle of 35°. Whereupon in Figure 4, viewing the binding from below, the 10° section A and the 35° section B is shown for the right foot.